

## ECTOPARASITES FROM CAPTIVE BIRDS.

I. 1936-1937.

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A LARGE number of birds, obtained from all parts of the world, die in aviaries in this country every year. It occurred to the authors that a record of ectoparasites from some of these captive birds might prove of considerable interest. Quite apart from the number of new species such a collection is likely to provide, the conditions found in aviaries particularly favour the study of straggling of parasites from one host to another, and the acquisition of new parasites by foreign birds bred in this country.

In the following list the Mallophaga<sup>1</sup> have been identified by Miss Theresa Clay, the Siphonaptera by the Hon. Miriam Rothschild, and the Acarina by Mrs. A. M. Hughes. The initials following each record, whether positive or negative, indicate the collector who examined the bird in question. The figure in brackets after the name of the host indicates the number of that species examined.

Various methods were employed for collecting the parasites, but owing to the poor state of preservation of many of the birds it was not always possible to guarantee the negative records. Mites were not collected by the junior author.

## GENERAL REMARKS.

A total of 128 birds was examined, including 91 species pertaining to 34 different families. Of this number, 90 specimens (65 species) were confined in captivity with various species of birds—thus providing ample opportunity for the straggling of parasites from one to another. The type of confinement varied from comparative freedom on a large lake to close confinement in an aviary or cage.

It has already been stated that mites were not collected from the birds examined at the London Zoo by the junior author, and it is therefore more convenient to study them apart from the lice. Only one bird was found to be harbouring fleas.

*Mallophaga*.—48 different species of Mallophaga were found distributed among 42 species of birds. The number of specimens infected was 48, or a little under half the total of the birds examined. On the whole the infections were not heavy, a comparatively small number of parasites being found on each bird. Notable exceptions to this were the Jay and Buzzard, which swarmed with parasites. The Hoopoe, Rosy-billed Pochard, and Stanley Crane were also fairly heavily infected. 10 species of birds showed infections with more than one species of Mallophaga.

11 of the birds were bred in captivity. Of these the Hoopoe, Rosy-billed Pochard, Emu, and Jackass Penguin were reared by their own parents. All proved to be infected, and the parasites were obviously acquired from the parents, except possibly in the case of the Jackass Penguin, which can have

<sup>1</sup> Before attempting to describe any of these species a revision of several genera is necessary, and for this purpose further material is required.

acquired the parasite either via its parents or directly from the other species of penguins (true hosts) with which it was confined. 6 birds were reared by foster parents (hens). 4 of these were ducks, kept on a large lake (pinioned) fully stocked with various water-fowl, including Geese, Oyster-catchers, Plovers, Curlew, etc. 2 acquired parasites, and it is worth noting that in both cases they proved to be typical duck parasites. On the other hand, one of the Madagascar Partridges, also reared by foster parents, acquired a parasite pertaining to a group which normally infests the Gressores.

The most highly infected group of birds proved to be the Cardinals. Out of 8 specimens (three species) 7 were infected. These included 5 species of lice. The least infected were the Waxbills. Out of 20 birds (four species) none were harbouring Mallophaga. The families Phasianidae and Fringillidae both showed a high percentage of infection; on the other hand, the Psittacidae, birds which are frequently infected in the wild, all proved negative.

The egg-laying habits of lice appear to vary specifically, both with regard to the site selected and the manner of attachment of the egg capsule. This is well illustrated in the case of *Degeeriella fusca* (p. 67) and *Degeeriella upupae* (p. 70). With regard to the former species, it would be of interest to ascertain whether the lice migrate directly after hatching from the egg. The Buzzard was examined shortly after death, and no very extensive post-mortem movement of the lice had probably occurred. That such a migration does take place was suggested by the fact that the young stages were distributed all over the body and not confined to the lower wing coverts upon which the eggs are laid. A return migration to this area must presumably be undertaken by the gravid female. It is hoped to pay more attention to the habits of the lice, and include figures of different eggs, when making future collections and lists.

Four cases only of straggling were recorded. As already mentioned, the Jackass Penguin had acquired a species of *Austrogoniodes* generally found on the Macaroni and Rock-hopper Penguins. The Kirghiz Pheasant was infected with two species of lice, *Lipeurus caponis* and *Goniodes meleagridis*. The former is usually found on the domestic fowl and certain game birds, while the true host of the latter is the Turkey. It is possible that other cases of straggling might become apparent if more information were available. Thus, for example, the *Brüelia* sp. obtained from the Dominican Cardinal could conceivably have the Red-crested Cardinal (with which it was confined) as the true host in nature. However, with the exception of the Madagascar Partridge infected with a single specimen of *Ardeicola* sp., we have no record of a type of parasite characteristic of one definite group of birds straggling on to a bird pertaining to another unrelated group. No evidence was obtained to disturb the belief that the Mallophaga are one of the best groups of parasites for assisting the study of host relationship. Even under such exceptionally favourable conditions the evidence of straggling is small.

It is worth drawing attention to the specimens of *Ricinus* sp. obtained from the Ruby and Topaz Humming Bird (confined with related species only). The presence of this genus of lice on a Humming Bird, which is otherwise characteristic of Passerine birds, is of interest in view of the controversy regarding the systematic position of the Trochilidae.

*Acarina*.—A total of 91 specimens (58 species) pertaining to 26 different families of birds was examined for mites (in addition to lice and fleas), of which

15 specimens (13 species) were found to be infected. The number of species of mites recorded was 14. This figure is relatively low, and it appears probable that some infestations were overlooked, particularly in the case of birds which were received in a poor state of preservation. As with the lice, the actual number of parasites on each bird was generally small. In the case of the genera *Cheyletiella*, *Laelaps*, and *Liponyssus*, this is explained by the fact that they are essentially parasites inhabiting the nests of their hosts, rather than the birds or mammals themselves. However, an exceptionally heavy infection was recorded for the Green Magpie, literally thousands of mites being present. This bird also provided the only record of two species of mites on the same host. 8 of the infections were found in association with lice.

9 of the birds were bred in captivity. 2 showed infection with mites. One of these, the Falcated Teal, was reared by foster parents and must have acquired the mites, as it did the Mallophaga with which it was infected. Unfortunately these specimens, together with a small series of the Scaly Ground Dove, were mislaid and are therefore omitted from the following list. No definite case of straggling was recorded. The genus *Laelaps* is, however, found more frequently on small mammals than on birds.

*Siphonaptera*.—The disappointing fact that only one record of fleas was made is probably due to the two following reasons. Firstly, fleas leave the host when it becomes cold, and in most cases the birds examined were collected several hours after death. Secondly, fleas, like many genera of mites, breed in the nests of the host, and are more likely to be collected there than on the bodies of the birds themselves.

## LIST OF PARASITES.

### I. SIPHONAPTERA (Fleas).

#### Ceratophyllidae.

Parasite.	Host.
<i>Ceratophyllus gallinae</i> Schranck 1803	<i>Dendrossa galericulata</i> (Linn.) 1758.

### II. MALLOPHAGA (Biting Lice).

#### Menoponidae.

* <i>Trinoton querquedulae</i> <sup>1</sup> (Linn.) 1758	{ <i>Anas falcata</i> (Georgi) 1775 <i>Anas formosa</i> (Georgi) 1775.
<i>Menacanthus</i> sp. ? . . . . .	<i>Turacus leucotis</i> (Rüppell) 1835.
<i>Menacanthus</i> sp. ? . . . . .	<i>Cyanops asiatica</i> (Latham) 1790.
<i>Myrsidea</i> sp. ? . . . . .	<i>Paroaria dominicana</i> (Linn.) 1758.
<i>Chapinia africana</i> (Bedford) 1929	<i>Bucorvus cafer</i> (Schleg.) 1862.
<i>Colpocephalum decimfasciatum</i> (Boisd. & Lacord.) 1835 . . . . .	<i>Ardea c. cinerea</i> Linn. 1758.
<i>Colpocephalum</i> sp. ? . . . . .	<i>Pavo cristatus</i> Linn. 1758.

<sup>1</sup> The species indicated by a star (\*) show slight variation which may ultimately prove to be subspecific.

**Ricinidae.**

*Ricinus* sp. n. . . . . *Chrysolampis elatus* (Linn.) 1758.

**Philopteridae.**

- Goniodes meleagridis* (Linn.) 1758 . . . . . *Phasianus colchicus mongolicus* (Brandt) 1844.
- Goniodes cervinicornis* Giebel 1874 . . . . . *Gennaeus leucomelanos hamiltoni* (Gray) 1829.
- Goniodes pavonis* (Linn.) 1758 . . . . . *Pavo cristatus* Linn. 1758.
- Goniodes* sp. n. . . . . *Diardigallus diardi* (Bonaparte) 1856.
- Goniocotes diplogonus* Giebel 1866 . . . . . *Tragopan satyra* (Linn.) 1758.
- Physconelloides* sp. ? . . . . . *Phaps c. chalconota* (Latham) 1790.
- Physconelloides* sp. ? . . . . . *Geophaps smithi* (Jard. & Selby) 1830.
- Austrogoniodes struthus* Harrison 1915 { *Eudyptes chrysolophus* (Brandt) 1837.  
*Eudyptes c. cristatus* (Miller) 1784.  
*Spheniscus demersus* (Linn.) 1758.
- Lipeurus caponis* (Linn.) 1758 . . . . . *Phasianus colchicus mongolicus* (Brandt) 1844.
- Lipeurus subsellatus* Harrison 1916 . . . . . *Gennaeus leucomelanos hamiltoni* (Gray) 1829.
- Oxylipeurus himalayensis* (Rudow) 1869 . . . . . *Tragopan satyra* (Linn.) 1758.
- Oxylipeurus* sp. n. . . . . *Oreortyx p. picta* (Douglas) 1823.
- Otilipeurus turmalis* (Denny) 1842 . . . . . *Otis t. tarda* (Linn.) 1758.
- Dahlehornia asymmetrica* (Giebel) 1866 . . . . . *Dromiceius n. novae-hollandiae* (Latham) 1790.
- Degeeriella rufa* (Burm.) 1838 . . . . . *Falco tinnunculus* (Linn.) 1758.
- \**Degeeriella fusca* (Denny) 1842 . . . . . *Buteo buteo* (Linn.) 1758.
- Degeeriella hospes* (Giebel) 1866 . . . . . *Squatarola squatarola* (Linn.) 1758.
- Degeeriella upupae* (Denny) 1842 . . . . . *Upupa e. epops* (Linn.) 1758.
- Brüelia glandarii* (Denny) 1842 . . . . . *Garrulus glandarius* (Linn.) 1758.
- Brüelia trithorax* (Burm.) 1838 . . . . . { *Paroaria cristata* (Boddaert) 1783.  
*Paroaria dominicana* (Linn.) 1758.
- Brüelia limbata* (Burm.) 1838 . . . . . *Loxia c. curvirostra* Linn. 1758.
- Brüelia* sp. ? . . . . . *Richmondia cardinalis* (Linn.) 1758.
- Brüelia* sp. ? . . . . . *Richmondia cardinalis* (Linn.) 1758.
- Brüelia* sp. ? . . . . . *Hypochaera chalybeata* (Müller) 1776.
- Brüelia* sp. ? . . . . . *Niltava grandis* (Blyth) 1842.
- Brüelia* sp. ? . . . . . *Cissa chinensis* (Boddaert) 1783.
- \**Philopterus citrinellae* (Schränk) 1776 . . . . . { *Paroaria dominicana* (Linn.) 1758.  
*Loxia c. curvirostra* Linn. 1758.
- Philopterus cursitans* (Giebel) 1861 . . . . . *Athene n. noctua* (Scop.) 1769.
- Philopterus* sp. ? . . . . . *Erythrura psittacea* (Gmel.) 1788.
- Philopterus* sp. ? . . . . . *Niltava grandis* (Blyth) 1842.
- Anatoecus* sp. ? . . . . . *Metapopiana peposaca* (Vieillot) 1818.
- Anatoecus* sp. ? . . . . . *Mareca sibilatrix* (Poeppig) 1829.
- Rallicola lugens* (Giebel) 1874 . . . . . *Porphyrio poliocephalus* (Latham) 1790.
- Ornithobius fuscus* Le Soeuf 1902 . . . . . *Chenopsis atrata* (Latham) 1790.

- \**Columbicola columbae* (Linn.) 1758 . . . . . *Geophaps smithi* (Jard. & Selby) 1830.
- Columbicola* sp. ? . . . . . *Scardafella squammata* (Lesson) 1831.
- Columbicola* sp. ? . . . . . *Phaps c. chalconota* (Latham) 1790.
- Columbicola* sp. ? . . . . . *Chalcophaps i. indica* (Linn.) 1758.
- \**Esthiopterella gruis* (Linn.) 1758 . . . . . *Tetrapteryx paradisea* (Licht.) 1793.
- Ardeicola* sp. ? . . . . . *Margaroperdix madagarensis* (Scop.) 1786.

## III. ACARINA (Mites).

**Analgesidae.**

- Megninia* sp. ? . . . . . *Cissa chinensis* (Boddaert) 1783.
- Pterolichus* sp. ? . . . . . *Cissa chinensis* (Boddaert) 1783.
- Pterolichus* sp. ? . . . . . *Recurvirostra avocetta* Linn. 1758.
- Pterolichus* sp. ? . . . . . *Niltava grandis* (Blyth) 1842.
- Pterolichus* sp. ? . . . . . *Melopsittacus undulatus* (Shaw) 1805.

**Laelaptidae.**

- Laelaps* sp. ? . . . . . *Acryllium vulturinum* (Hardwicke) 1834.

**Liponyssidae.**

- Liponyssus* sp. ? . . . . . *Tiaris canora* (Gmel.) 1788.
- Liponyssus* sp. ? . . . . . *Cyanops asiatica* (Latham) 1790.
- Liponyssus* sp. ? . . . . . *Richmondia cardinalis* (Linn.) 1758.

**Cheyletidae.**

- Cheyletiella* sp. ? . . . . . *Estrilda melopoda* (Vieillot) 1817.
- Cheyletiella* sp. ? . . . . . *Paroaria dominicana* (Linn.) 1758.
- Cheyletiella* sp. ? . . . . . *Paroaria cristata* (Boddaert) 1783.

## LIST OF HOSTS.

**Dromiceiididae.**

*DROMICEIUS N. NOVAE-HOLLANDIAE* (Latham) 1790, Emu (1). London Zoo,<sup>1</sup> November 1937. Bred at Whipnade. Confined with same species only. 1 ♂, 5 ♀♀ *Dahlehornia asymmetrica*. (T. C.)<sup>2</sup>

**Spheniscidae.**

*SPHENISCUS DEMERSUS* (Linn.) 1758, Jackass Penguin (1). London Zoo, 1937. Bred in captivity. Confined with various other species of penguins. 19 ♂♂, 23 ♀♀ *Austrogoniodes struthus*. This infection was probably acquired from another species of penguin as it is not the usual species of *Austrogoniodes* found on this bird. (T. C.)

*EUDYPTES CHRYSOLOPHUS* (Brandt) 1837, Macaroni Penguin (1). London Zoo, April 1937. Obtained from the Antarctic. Confined with various species of penguins. 5 ♀♀ *Austrogoniodes struthus*. (T. C.)

<sup>1</sup> "London Zoo" refers to the Zoological Society of London, Regent's Park.

<sup>2</sup> T. C. = Theresa Clay, M. R. = Miriam Rothschild, E. M. = Elizabeth Meyerhof.

*EUDYPTES C. CRESTATUS* (Miller) 1784, Rock-hopper Penguin (1). London Zoo, April 1937. No data. Confined with various species of penguins. 12 ♂♂, 8 ♀♀ *Austrogoniodes strutheus*. (T. C.)

#### Podicipidae.

*PODICEPS C. CRISTATUS* (Linn.) 1758, Great Crested Grebe (1). London Zoo, 1937. Died on arrival. No data. No Mallophaga or Siphonaptera. (T. C.)

#### Ardeidae.

*ARDEA C. CINEREA* Linn. 1758, Common Heron (2). London Zoo, January 1937. ♀ obtained in Great Britain. Confined with various species of birds; 3 ♂♂, 7 ♀♀ *Colpocephalum decimfasciatum*. The second specimen, obtained on the Continent of Europe, confined with various species of birds; no Mallophaga or Siphonaptera. (T. C.)

*BUBULOUS IBIS COROMANDUS* (Boddaert) 1783, Buff-backed Heron (1). London Zoo, 1937. Obtained from India, confined with various species of birds. No Mallophaga or Siphonaptera. (T. C.)

#### Phoenicopteridae.

*PHOENICOPTERUS ANTIQUORUM* Temminck 1820, Flamingo (1). Lilford Aviaries, 22.3.37. Obtained from Egypt. Free on lake for several years with various species of water-fowl. No ectoparasites. (E. M.)

#### Anatidae.

*CHENOPSIS ATRATA* (Latham) 1790, Australian Black Swan (1). London Zoo, November 1936. ♀ obtained from Australia, confined with various species of birds. 12 *Ornithobius fuscus*. (T. C.)

*ANAS FALCATA* Georgi 1775, Falcated Teal (1). Lilford Aviaries, 15.9.37. Bred in England, reared by foster parent (hen). Free on lake with various water-fowl. 1 ♂, 1 ♀ *\*Trinoton querquedulae* in breast feathers. No eggs noted. A small series of unidentified mites on the superficial head and neck feathers. (M. R.)

*ANAS CASTANEA* (Eyton) 1838, Chestnut-breasted Teal (1). Lilford Aviaries, 16.3.37. Bred in England. Conditions as above. No ectoparasites. (M. R.)

*ANAS CYANOPTERA* Vieillot 1816, Cinnamon Teal (1). Lilford Aviaries, 12.3.37. Bred in England. Conditions as above. No ectoparasites. (M. R.)

*ANAS FORMOSA* Georgi 1785, Clucking Teal (1). Lilford Aviaries, 9.2.37. ♀ obtained from Japan or Siberia. Free on lake for about three years with various water-fowl. 1 ♂ *\*Trinoton querquedulae* in breast feathers. No eggs noted. (M. R.)

*ANAS DISCORS* Linn. 1766, Blue-winged Teal (1). London Zoo, 1937. Obtained from North America, confined with various species of ducks. No Mallophaga or Siphonaptera. (T. C.)

*AIX SPONSA* (Linn.) 1758, Carolina Duck (1). Dudley Zoo, 17.9.37. Obtained from North America. Confined with various species during captivity. No ectoparasites. (M. R.)

*DENDRONESSA GALERICULATA* (Linn.) 1758, Mandarin Duck (1). London Zoo, March 1937. Confined with various species of birds. A series of ♂♂ and ♀♀ of *Ceratophyllus gallinae* from breast feathers. (T. C.)

*MARECA SIBILATRIX* (Poeppig) 1829, Chiloe Wigeon (1). Lilford Aviaries, 27.8.37. Bred in England, reared by foster parent. Free on lake with various water-fowl. 1 ♀ and 1 immature *Anatoecus* sp. ? on head. No eggs noted. (M. R.)

*METAPOPIANA PEPOSACA* (Vieillot) 1818, Rosy-billed Pochard (1). Lilford Aviaries, 21.12.36. Bred in England, reared by own parents. Conditions as above. A fairly heavy generalized infection of *Anatoecus* sp. ? (M. R.)

#### Accipitridae.

*ACCIPITER NISUS* (Linn.) 1758, Sparrow Hawk (1). Dudley Zoo, 7.9.37. Captured near Birmingham and subsequently confined alone. No ectoparasites. (M. R.)

*BUTEO BUTEO* (Linn.) 1758, Common Buzzard (1). Lilford Aviaries, August 1937. Captured in Devonshire, England. Confined with same species only. Exceedingly heavy general infection with *\*Degeeriella fusca*. Eggs confined to the surface of the basal half of lower wing coverts close to the body. As many as 160 eggs on one feather. (M. R.)

*FALCO TINNUNCULUS* (Linn.) 1758, Kestrel (2). One specimen for which we have no data, infected with *Degeeriella rufa*. Second specimen Dudley Zoo, 22.3.37. Captured near Dudley. Confined alone. No ectoparasites. (M. R.)

#### Phasianidae.

*OREORTYX P. PICTA* (Douglas) 1823, Plumed Quail (1). London Zoo, 1937. No data. Confined with various species of birds. Infected with *Oxylipeurus* sp. n. (T. C.)

*TRAGOPAN SATYRA* (Linn.) 1758, Satyr Tragopan (1). London Zoo, 1937. Obtained from India, confined with various species of birds. Infected with *Goniocotes diplogonus* and *Oxylipeurus himalayensis*. (T. C.)

*GENNAEUS LEUCOMELANOS HAMILTONI* (Gray) 1829, White-crested Kaleege (1). London Zoo, June 1937. Obtained from Western Himalayas, India. Confined with various species of birds. 2 ♂♂, 2 ♀♀ *Lipeurus subsellatus*, and 8 ♂♂, 6 ♀♀ *Goniodes cervinicornis*. (T. C.)

*DIARDIGALLUS DIARDI* (Bonaparte) 1856, Siamese Crested Fireback (1). London Zoo, February 1937. Obtained from Siam, confined with various species of birds. 6 ♂♂, 10 ♀♀ *Goniodes* sp. n. (T. C.)

*PHASIANUS COLCHICUS MONGOLICUS* (Brandt) 1844, Kirghiz Pheasant (1). London Zoo, 1937. Obtained from Mongolia, confined with various species of birds. Infected with *Lipeurus caponis* and *Goniodes meleagridis*. The true host of the latter species is the Turkey. (T. C.)

*PAVO CRISTATUS* Linn. 1758, Peafowl (2). London Zoo, December 1936 and June 1937. 2 ♀♀ obtained from India, confined with various species of birds. First specimen with 2 ♂♂, 8 ♀♀, 4 immature *Goniodes pavonis*. Second specimen with 4 ♂♂, 4 ♀♀ *Goniodes pavonis* and 1 ♂, 2 ♀♀ *Colpocephalum* sp. ? (T. C.)

*ACRYLLIUM VULFURINUM* (Hardwicke) 1834, Vulturine Guinea-fowl (1). Lilford Aviaries, December 1936. Obtained from Somaliland. At liberty for

about six years in an enclosure of about three acres, together with various species of birds. Two specimens of *Laelaps* sp. ? (M. R.)

**MARGAROPERDIX MADAGARENSIS** (Scop.) 1786, Madagascar Partridge (2). Foxwarren Park, 16.12.36 and 4.2.37. Both specimens bred in England, reared by foster parents, and confined with various other birds. One infected with a single specimen of *Ardeicola* sp. ?, a straggler from one of the Gressores. The second bird without ectoparasites. (M. R.)

#### Gruidae.

**TETRAPTERYX PARADISEA** (Licht.) 1793, Stanley Crane (1). London Zoo, December 1936. ♂ obtained from Cape Colony, confined with another crane. 109 ♂♂, 247 ♀♀, 246 immature \**Esthiopterella gruis*. (T. C.)

#### Rallidae.

**PORPHYRIO POLIOCEPHALUS** (Latham) 1790, Grey-headed Gallinule (1). Lilford Aviaries, 5.2.37. Obtained from India. Confined with jungle fowl and wild guinea fowl for about six years. A fairly generalised infection with *Rallicola lugens*. This species seems more firmly attached to the feathers than is generally the case. (M. R.)

#### Otididae.

**OTIS T. TARDA** Linn. 1758, Great Bustard (1). London Zoo, February 1937. ♀ obtained from Hungary, confined with various species of birds. 5 ♂♂, 10 ♀♀ *Otilipeurus turmalis*. (T. C.)

#### Charadriidae.

**SQUATAROLA SQUATAROLA** (Linn.) 1758, Grey Plover (2). Ashton Wold, August 1937. A pair from Great Britain. Confined together in a large garden. One showed a light general infection of *Degeeriella hospes*. (M. R.)

#### Recurvirostridae.

**RECURVIROSTRA AVOCETTA** Linn. 1758, Avocet (1). Foxwarren Park, 22.1.37. Obtained on the Continent of Europe. Heavily infected with *Pterolichus* sp. ? The mites were situated between the barbules of the retrices, parallel with them, close to the shaft of the feather. The white feathers showed discoloration. (M. R.)

#### Chionidae.

**CHIONIS ALBA** (Gmel.) 1788, Sheath-bill (1). London Zoo, 1937. Obtained from the South Shetlands, confined with numerous other species of birds. No Mallophaga or Siphonaptera. (T. C.)

#### Laridae.

**LARUS DOMINICANUS** Licht. 1823, Southern Black-backed Gull (1). London Zoo. No data. Confined with various species of birds. No Mallophaga or Siphonaptera. (T. C.)

**LARUS N. NOVAE-HOLLANDIAE** Stevens 1826, Silver Gull (1). London Zoo, 1937. Bred in captivity, confined with various species of birds. No Mallophaga or Siphonaptera. (T. C.)

#### Columbidae.

**GEOPHAPS SMITHI** (Jard. & Selby) 1830, Smith's Partridge Pigeon (1). Foxwarren Park, 26.3.37. Obtained in Australia. Confined with various species of birds. A fairly general infection with *Physconelloides* sp. ? and 2 specimens of \**Columbicola columbae*. (M. R.)

**GALLICOLUMBA JOBIENSIS** (A. B. Meyer) 1875, White-breasted Ground Dove (1). Foxwarren Park, 30.4.37. Obtained from Jobi Island. Confined with various species of birds. No ectoparasites. (M. R.)

**ZENAIDA ASIATICA** (Linn.) 1758, White-winged Dove (1). Lilford Aviaries, 7.2.37. Obtained from Mexico. Confined for two years at least with various other birds. No ectoparasites. (M. R.)

**SCARDAFELLA SQUAMMATA** (Lesson) 1831, Scaly Ground Dove (1). Dudley Zoo, 2.9.37. Possibly bred in captivity. Confined with various species of birds. One specimen of *Columbicola* sp.?, and a small series of mites (unidentified). (M. R.)

**CHALCOPHAPS I. INDICA** (Linn.) 1758, Emerald Dove (1). London Zoo. No data. Confined with various species of birds. Infected with *Columbicola* sp. ? (T. C.)

**PHAPS C. CHALCOPHAPS** (Latham) 1790, Common Bronze-wing (1). London Zoo, November 1936. Obtained from Australia, confined with various species of birds. 9 ♂♂, 38 ♀♀ *Physconelloides* sp. ? and 1 ♂, 3 ♀♀ *Columbicola* sp. ? (T. C.)

#### Cuculidae.

**CUCULUS C. CANORUS** Linn. 1758, Common Cuckoo (2). Dudley Zoo, 8.8.37 and 23.8.37. Captured near Dudley, England. Confined separately. No ectoparasites. (M. R.)

**GUIRA GUIRA** (Gmel.) 1788, Guira Cuckoo (1). London Zoo, 1937. Obtained from Paraguay, confined with various species of birds. No Mallophaga or Siphonaptera. (T. C.)

#### Psittacidae.

**MELOPSITTACUS UNDULATUS** (Shaw) 1805, Budgerigar (3). Dudley Zoo, 13.8.37 and 6.9.37. London Zoo, 1937. The two specimens from Dudley were bred in captivity and confined with various species of birds. One showed a light infection of *Pterolichus* sp. ? (E. M.) The specimen from London Zoo was obtained from Australia. No Mallophaga or Siphonaptera. (T. C.)

**AGAPORNIS ROSEICOLLIS** (Vieillot) 1817, Rosy-faced Love Bird (1). Dudley Zoo, 6.8.37. Obtained from Africa. Confined separately since it reached this country. No ectoparasites. (E. M.)

**PLATYCERCUS ADCITUS** (Latham) 1790, Pale-headed Rosella (1). Foxwarren Park, 7.1.37. Obtained from Queensland or New South Wales. Confined alone. No ectoparasites. (E. M.)

**TRICHOGLOSSUS HOEMATODUS RUBRITORQUIS** Vigors & Horsf. 1827, Red-collared Lorikeet (1). London Zoo, 1937. Obtained from North-west Australia, confined with the same species only. No Mallophaga or Siphonaptera. (T. C.)

**LEPTOLOPHUS HOLLANDICUS** (Kerr) 1792, Quarrion (1). London Zoo, 1937. Obtained from Australia, confined with the same species only. No Mallophaga or Siphonaptera. (T. C.)

**PSITTACUS E. ERITHACUS** Linn. 1758, Grey Parrot (1). London Zoo, 1937. Obtained from the Gold Coast, Africa, confined with another bird of the same species. No Mallophaga or Siphonaptera. (T. C.)

#### Musophagidae.

**TURACUS LEUCOTIS** (Rüppell) 1835, White-cheeked Plantain Eater (1). Lilford Aviaries, 1937. Obtained from Africa. Kept in large aviary with various species of birds, for about five years. A light infection of *Menacanthus* sp. ? (M. R.)

#### Bucerotidae.

**TROPICRANUS ALBOCRISTATUS** (Cassin) 1848, White-crested Hornbill (2). Foxwarren Park, 1.3.37. Obtained from Africa. Confined alone. No ectoparasites. (E. M.)

**BUCORVUS CAFER** (Schleg.) 1862, Ground Hornbill (1). London Zoo, November 1937. Obtained from Cameroons, confined with various species of other birds. 1 ♀ *Chapinia africana*. (T. C.)

#### Strigidae.

**BUBO CAPENSIS** (Smith) 1834, Cape Eagle Owl (1). Dudley Zoo, 2.8.37. Wings only examined. Obtained from South Africa. Confined with other owls. No ectoparasites. (E. M.)

**ATHENE N. NOCTUA** (Scop.) 1769, Little Owl (1). London Zoo, 1937. ♀ obtained from Germany, confined with other owls. 9 ♂♂, 26 ♀♀ *Philopterus cursitans*. (T. C.)

#### Upupidae.

**UPUPA EPOPS** Linn. 1758, Hoopoe (1). Foxwarren Park, 14.12.36. Bred in captivity and reared by own parents. Very heavily infected with *Degeeriella upupae*. Eggs laid in numbers on breast feathers, parallel with barbules, at right angles to shaft. (M. R.)

#### Capitonidae.

**CYANOPS ASIATICA** (Latham) 1790, Blue-throated Barbet (4). Dudley Zoo, 7.8.37, 22.7.37, 11.9.37, and 18.9.37. Obtained from the Himalayas. Not confined with other species of birds. Two specimens with a light general infection of *Menacanthus* sp. ? Eggs laid in groups at the base of breast and neck feathers. A light infection on one bird of *Liponyssus* sp. ? (M. R.)

#### Pittidae.

**PITTA CYANEA** Blyth 1843, Blue Pitta (1). Foxwarren Park, 16.12.36. Obtained from Java. Confined alone. No ectoparasites. (E. M.)

#### Muscicapidae.

**NILTAVA GRANDIS** (Blyth) 1842, Greater Niltava (1). Foxwarren Park, 22.1.37. Obtained from East Himalayas. Confined alone. A single specimen of *Brüelia* sp. ?, *Philopterus* sp. ? and *Pterolichus* sp. ? (M. R.)

#### Turdidae.

**KITTACINCLA MALABARICA INDICA** (Baker) 1924, The Shama (1). London Zoo, 1937. Obtained from India. Confined alone. No Mallophaga or Siphonaptera. (T. C.)

#### Timeliidae.

**HETEROPHASIA PICAOIDES** Hodgson 1839, Long-tailed Sibia (2). Foxwarren Park, 22.12.36 and 10.3.37. Birds confined together and not with other species. No ectoparasites. (M. R. and E. M.)

#### Corvidae.

**CISSA CHINENSIS** Boddaert 1783, Green Magpie (1). Foxwarren Park, 12.12.36. Obtained from India. A few specimens of *Brüelia* sp. ? No eggs observed. An exceptionally heavy infection of *Megninia* sp. ? and *Pterolichus* sp. ? (M. R.)

**GARRULUS LIDTHI** Bonaparte 1850, Lidthi's Jay (1). Foxwarren Park, 17.1.37. Obtained in Northern Group of Rynkyn Islands. Confined with various species of birds. No ectoparasites. (E. M.)

**GARRULUS GLANDARIUS** (Linn.) 1758, Common Jay (1). Dudley Zoo, 27.7.37. Captured in Britain and confined with domestic pigeons. Extremely heavily infected with *Brüelia glandarii*. (M. R.)

#### Tanagridae.

**STEPHANOPHORUS DIADEMATUS** (Temminck) 1829, White-capped Tanager (1). Foxwarren Park, 14.1.37. Obtained from Northern Argentine. Confined with various species of birds. No ectoparasites. (E. M.)

#### Ploceidae.

**ESTRILDA ASTRILDA SANCTAEHELENAE** Shelley 1903, St. Helena Waxbill (12). Dudley Zoo, July-September 1937. All these birds were confined with various species of birds. All negative for ectoparasites. (M. R.)

**ESTRILDA MELPODA** (Vieillot) 1817, Orange-cheeked Waxbill (4). Dudley Zoo, 12.7.37, 23.7.37. Obtained from West Africa and confined with various species of birds. Two specimens with a fairly generalized infection of *Cheyletiella* sp. ? (M. R.)

**ESTRILDA SUBFLAVA** (Vieillot) 1819, Zebra Waxbill (3). Dudley Zoo, 12.8.37, 24.8.37, and London Zoo, 1937. Obtained from Africa, confined with various species of birds. No ectoparasites. (M. R. and T. C.)

**ESTRILDA TROGLODYTES** (Licht.) 1823, Grey Waxbill (1). London Zoo, 1937. Obtained from West Africa, confined with various other birds. No Mallophaga or Siphonaptera. (T. C.)

**OTHYPHANTES REICHENOWI** (Fischer) 1884, Reichenow's Weaver (1). Dudley Zoo, 7.4.37. From Kenya Colony. Confined with various species of birds. No ectoparasites. (M. R.)

**POEPHILA ACUTICAUDA** (Gould) 1842, Long-tailed Finch (1). Foxwarren Park, 14.12.36. Obtained from Australia. Confined with various birds. No ectoparasites. (M. R.)

**URAEGINTHUS BENGALUS** (Linn.) 1866, Red-cheeked Cordon Bleu (2). Dudley Zoo, 27.7.37. Obtained from Africa. Confined with various species of birds. No ectoparasites. (M. R.)

**EUPLECTES FRANCISCANA** (Isert) 1789, Orange Bishop (1). Dudley Zoo, 1937. Obtained from West Africa. Confined with various species of birds. No ectoparasites. (M. R.)

*HYPOCHAERA CHALYBEATA* (Müller) 1776, Combassont (2). Dudley Zoo, 11.9.37. Both birds confined with various species of birds. One with a light general infection of *Brüelia* sp. ? The eggs laid singly, 1-3 on the same feather, along the shaft of the breast feathers. (M. R.)

*MUNIA MALACCA* (Linn.) 1766, Black-headed Munia (1). Dudley Zoo, 30.7.37. Obtained from Ceylon, India. Confined with various species of birds. No ectoparasites. (M. R.)

*PADDO ORYZIVORA* (Linn.) 1758, Java Sparrow (1). Dudley Zoo, 12.8.37. Confined with various species of birds. No ectoparasites. (M. R.)

#### Sturnidae.

*SPREO SUPERBUS* (Rüppell) 1845, Superb Glossy Starling (1). Foxwarren Park, 10.8.37. Obtained from East Africa. Confined with other species of birds. No ectoparasites. (M. R.)

*LEUCOPHASER ROTHSCHILDI* Stres. 1912, Rothschild's Grackle (1). Foxwarren Park, 7.2.37. Obtained from Bali Islands. Confined with various species of birds. No ectoparasites. (M. R.)

#### Graculidae.

*GRACULA RELIGIOSA* Linn. 1758, Indian Grackle (1). Dudley Zoo, 30.7.37. Obtained from Northern India. No ectoparasites. (E. M.)

#### Icteridae.

*ICTERUS BONANA* (Linn.) 1766, Martinique Oriol (1). Foxwarren Park, 4.1.37. Confined alone. No ectoparasites. (M. R.)

*QUISCALUS QUISCULA* (Linn.) 1758, Purple Grackle (1). Foxwarren Park, 24.2.37. Obtained from Southern America. Confined with various species of birds. No ectoparasites. (M. R.)

#### Fringillidae.

*LOXIA C. CURVIROSTRA* Linn. 1758, Crossbill (1). London Zoo, February 1937. Obtained in Europe. Confined with many various species of birds. 2 ♂♂, 4 ♀♀ *Brüelia limbata* and 3 ♂♂, 6 ♀♀ *\*Philopterus citrinellae*. (T. C.)

*CHLORIS CHLORIS* (Linn.) 1758, Greenfinch (1). Dudley Zoo, 2.8.37. Obtained near Oxford, England. Confined with various species of birds. No ectoparasites. (M. R.)

*ERYTHRURA PSITTACEA* (Gmel.) 1788, Royal Parrot Finch (2). Mr. Partridge's Aviaries, 11.8.37. Obtained from Numea. No contact with other species of birds. Many empty egg capsules on breast feathers. One specimen of *Philopterus* sp. ? (M. R.)

*TIARIS CANORA* (Gmel.) 1788, Cuban Grassquit (1). Dudley Zoo, 2.7.37. Confined with other birds of the same species only. Two specimens of *Liponyssus* sp. ? (M. R.)

*RICHMONDENA CARDINALIS* (Linn.) 1758, Virginian Cardinal (4). Dudley Zoo, 9.7.37, 23.8.37, 2.9.37, and 15.7.37. Obtained from Eastern U.S.A. Three of the birds had light general infections of *Liponyssus* sp. ? and three different *Brüelia* sp. ? were found among them. Eggs laid about the bill and neck. (M. R.)

*PAROARIA CRISTATA* (Boddaert) 1783, Red-crested Cardinal (1). Dudley Zoo, 6.9.37. Confined with various species of birds. *Brüelia trithorax* around face and cheek. A few on the breast feathers. Eggs around face. A light general infection with *Cheyletiella* sp. ? (M. R.)

*PAROARIA DOMINICANA* (Linn.) 1758, Dominican Cardinal (3). Dudley Zoo, 23.7.37, 16.7.37. From Eastern Brazil. Confined with *P. cristata*. Two birds with *Brüelia trithorax* on head. Eggs around bill, throat, and top of head. One specimen of *Myrsides* sp. ? Also one specimen of *Cheyletiella* sp. ? (M. R.)

On the third bird, a light infection of *Brüelia* sp. ? and *\*Philopterus citrinellae*. (E. M.)

#### Trochilidae.

*CHRYSOLAMPIS ELATUS* (Linn.) 1766, Ruby and Topaz Humming Bird (1). Ashton Wold, September 1936. Obtained from Brazil and only came into contact with other species of humming birds. 1 ♂, 1 ♀, and 1 immature specimen of *Ricinus* sp. n. Eggs laid singly on throat feathers. (M. R.)

*EUPETOMENA MACROURA* (Gmel.) 1788, Swallow-tail Humming Bird (1). London Zoo, 1937. Confined with various species of birds. No Mallophaga or Siphonaptera. (T. C.)

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